

2007 Connecticut Agricultural Experiment Station - Research Annual Report

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I. Report Overview

1. Executive Summary

Good progress was made on research and outreach programs in meeting planned objectives in all 4 planned programs: Food Safety and Biosecurity, Human and Animal Health, Plant and Integrated Management (IPM) Systems, and Soil and Water Quality. Cooperation with extension personnel at the University of Connecticut (UCONN), Cornell University and other land-grant institutions facilitated the transfer of new scientific information to a broad base of stakeholders. In the Food Safety and Biosecurity Program, there were 3 important events where analyses yielded results that had state or national impacts by changing conditions. Children at two elementary schools in Connecticut became ill after consuming flavored milk. Chemical analyses detected sanitizing fluid, used to flush filling lines at a dairy plant, in milk samples. These results were obtained within 4 hours of receiving the milk samples from state inspectors. There was a subsequent recall of all milk from the contaminated source, and corrective action was taken in the dairy plant. These actions prevented adulterated products from reaching consumers. In other analyses, toothpaste imported from China was found to contain ethylene glycol and/or diethylene glycol, components of antifreeze. Contaminated toothpaste was removed from the market as well as from Connecticut hospitals and prisons. Stricter labeling requirements are being considered by Congress. Toys imported from China were analyzed, and some samples were found to contain unacceptable concentrations of lead. These findings led to the recall of thousands of toys from retail sale and the establishment of more extensive lead monitoring programs nationally. In the Human and Animal Health Research Program, there were 2 outcomes that resulted in change in knowledge or behavior. Statewide surveillance of mosquitoes for West Nile and other encephalitis viruses revealed widespread geographic distribution of infected mosquitoes. News releases alerted public health officials and the general public of where the infected mosquitoes were collected. Control efforts to reduce mosquito populations followed. Nearly half of the residents polled in two different surveys acknowledged that they closely followed the recommendations given in news releases and had increased awareness of mosquito-transmitted viruses. Collaboration with scientists in the USDA/ARS has resulted in the transfer of new knowledge and surveillance techniques to other states. In a second study of the bacterial agent that causes tularemia in people and domesticated animals, analyses of cat sera revealed antibodies to this disease organism. Prior to this work, there was no evidence of this disease occurring in Connecticut. Physicians and veterinarians are now including tularemia in differential diagnoses as a possible cause of unknown febrile illnesses in their patients. The new techniques developed to detect the antibodies will facilitate laboratory diagnosis and be a useful tool for ecological and epidemiological studies of tularemia. Research on plants and IPM systems led to increased profits for growers, new specialty crops, or less pesticide use and reduced health risks. Growers requested assistance on controlling mites and scale insect pests so that quality arborvitae could be shipped from Connecticut. Field tests in 4 selected nurseries revealed that minimal, well-timed applications of short-lived permethrin-based insecticides controlled the targeted pests; 364,776 arborvitae plants (valued at about \$12,767,160) were shipped by these nurseries for sale in Connecticut or out-of-state markets. In addition to increased profits, a lower amount of a less toxic pesticide was used, thereby reducing health risks to pesticide users and reducing risk of contaminating ground and surface water sources. There are 22 wineries in Connecticut, which add substantially to local economies when tourists spend money in restaurants, hotels, bed and breakfasts, etc. Wine products are in demand by consumers. Grape growers requested assistance on evaluating Pinot Gris cultivars, the fruit of which makes excellent wines. Vines grafted to certain rootstocks survived Connecticut winters and yielded excellent grape yields. These findings had immediate impact because planting vines on rootstocks more resistant to winter damage can result in a savings of about \$7.40 for each year of lost production per vine, plus costs of about \$4.50 associated with replacement and labor involved in removing diseased vines and replanting. There is a potential savings of about \$1,400 per acre during 3 years of re-establishment costs. Growers are planning to include Pinot Gris in their vineyards. This research is a part of NE-1020, a multistate program that has a substantial extension component with Cornell University. Information also has been transferred to a UCONN extension specialist. There has been success in restoring water quality in lakes and ponds where invasive plants grow. Low concentrations of an herbicide removed Eurasian milfoil, variable milfoil, and cabomba from 4 lakes. This change in condition was significant because the technique is being used by a private company to correct weed infestations in other lakes. Achieving successful outcomes and impacts depends on effective stakeholder interactions and outreach programs. There have been at least 239,456 direct or indirect contacts with adults and youth in Connecticut plus results of staff members giving talks and interviews, making farm visits, performing diagnostic tests, and answering citizens' inquiries. Stakeholders have access to 93 new peer-reviewed articles or fact sheets. The assistance of 64 reporters (representing newspapers, television, and radio) and public access to an upgraded Station website continue to be powerful methods of transferring new knowledge. For the latter, there were 1,885,434 page views during 2007. The average user time per page view at a specific site was about 8 minutes.

Total Actual Amount of professional FTEs/SYs for this State

Year:2007	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	31.0	0.0
Actual	0.0	0.0	29.3	0.0

II. Merit Review Process**1. The Merit Review Process that was Employed for this year**

- Expert Peer Review
- Other (Internal administrative and scientific review)

2. Brief Explanation

The review process described in the updated Plan of Work was followed during this reporting period. All scientific proposals submitted to USDA-CSREES or other federal agencies received merit and peer-reviews to determine if the planned research had relevance to stakeholders' needs, met program goals, and had sufficient technical structure and resources to conduct the studies. In addition to critiques given by scientists in the discipline, Department Heads, the Vice-Director and the Director were involved in the internal review process. The Director gave final approval of all research proposals and manuscripts. In addition to meeting stakeholders' needs, two other criteria, which received particularly close scrutiny, are likelihood of success and originality of the study. During 2007, there were 8 Hatch and McIntire Stennis project outlines reviewed and submitted to USDA/CSREES to address state and national needs and to accomplish planned research goals in the following programs: Food Safety and Biosecurity (n = 1) and Plant and Integrated Pest Management Systems (n = 6). The approved project outlines described work on the uptake of persistent organic pollutants by plants, methods to study light stress in plants, insecticides in honey bees, solutions for overall honey bee health (NC-508), detecting wood-boring insects, chemical ecology of wood-boring insects, and Fusarium infections in plants. The remaining project outline, multistate project NE-507, was on mosquitoes and disease. Additional expert peer-review was also received on the quality of research results when manuscripts were examined by journal editorial boards and reviewers and when grant proposals submitted for competitive funds were critiqued by scientific review panels.

III. Stakeholder Input**1. Actions taken to seek stakeholder input that encouraged their participation**

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Survey of the general public
- Survey specifically with non-traditional groups
- Survey specifically with non-traditional individuals
- Survey of selected individuals from the general public
- Other (Targeted invitations to legislators and their staff members)

Brief Explanation

Local newspapers and radio stations in the New Haven area helped to promote 2 Open Houses in the spring and summer (Plant Science Day). For the latter, a one-page promotional flyer was delivered to at least 92,000 households in an edition of the New Haven Register preceding Plant Science Day. Attendance at the April event (105 persons in the main auditorium) and at the August Plant Science Day at Lockwood Farm (841 adults, 184 youths) was good. Press coverage of the talks and displays helped disseminate new scientific findings to persons not in attendance. Connecticut Network (CT-N), a public TV station, taped the main speaker's talk and 4 scientists' presentations at Plant Science Day for statewide telecasting. Extensive media assistance targeted the non-traditional stakeholder groups and individuals. Notices of these public events were also mailed or e-mailed to 220 press contacts and 5,709 state residents on the Station's contact list to cover traditional stakeholder groups and individuals. Station displays of research, presented at regional or state fairs, and invitations for high school students to tour Station laboratories, provided further opportunities to reach traditional and non-traditional stakeholders. For example, Farm/City Week is a statewide event, which provides urban families an opportunity to see farm research plots; 677 students (grades 3 to 7), 22 teachers, and 90 chaperones saw Station displays. Hundreds of students and teachers, who attended the CPTV Science Expo, also had an opportunity to learn about Station research. Survey forms were distributed at both Open Houses plus at selected exhibits in statewide agricultural trade shows to seek written public comment on research programs and to encourage stakeholder participation. There were thousands of citizens, who saw Station exhibits on agricultural, forestry, and public health topics and had opportunities to bring insect, plant, and soil samples for diagnostic testing. These stakeholders represented an excellent cross-section of traditional and non-traditional groups and individuals. To determine if state residents were following recommendations to reduce mosquito bites and the chances of acquiring mosquito-borne encephalitis viruses, the New Haven Register followed the Director's request to seek public comment. Although anecdotal, feedback indicated that many people were indeed following recommendations. Station scientists and administrators served on advisory boards and committees of at least 90 agricultural and environmental civic groups. Invasive aquatic plant problems were identified at these meetings of traditional groups and individuals. Moreover, scientists and technicians made 224 visits to farms where agricultural pest problems occurred and worked with growers on their properties to find solutions for controlling insect pests and plant diseases. Finally, 2 state representatives, the president of the state Senate, staff from the state Office of Fiscal Analysis, and assistants of a member of Congress visited the Station, saw testing done on foods for toxic chemicals and analyses of mosquitoes for encephalitis viruses, and made comment.

2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Advisory Committees
- Open Listening Sessions
- Needs Assessments
- Use Surveys
- Other (Public access to diagnostic laboratories)

Brief Explanation

There are several mechanisms in place to identify individuals and groups of stakeholders and to collect input from them. Active participation of Station scientists or technicians on 90 advisory boards of civic groups, representing different agricultural, forestry, environmental or public health interests, is an excellent way to identify users of Station research findings, receive stakeholder input, identify problems that need to be addressed, and to find solutions. Current research on crops for biodiesel fuel started as a result of requests from the fuel industry, dairy farmers who have the land to grow soybeans and rapeseed, and the state legislators. Work on removing invasive plants from lakes was initiated when Station scientists attended lake association meetings. Station staff members, who were officers of civic groups, recognized the needs of the public and were able to respond. The two annual Open House events of the Station and frequent use of displays at public meetings, trade shows, and science fairs provided opportunities to meet stakeholders who are interested in science issues and to hear about the problems that need attention. Special listening sessions held by Station scientists during evenings for growers or by the State Department of Agriculture and survey results were especially useful in collecting public input. About 867 talks and interviews were given to civic groups and the media. Discussion during question and answer periods following talks and interviews with reporters was an effective process in collecting input and in performing needs assessments. Research priorities on food safety, solving crop pest problems, providing new niche crops, biofuels, and mosquitoes and ticks as transmitters of disease organisms were set as a result of public input. Phone inquiries from the public and stakeholder access to diagnostic services also revealed important problems that needed attention. For example, nursery managers brought diseased chrysanthemums in for examination. A fungal rust infection was diagnosed. Quarantines and treatment of thousands of plants ensued. Further, frequent attendance at agricultural groups' meetings was very helpful in collecting stakeholder input. Pest problems, difficulties in receiving permits for plant shipments and pesticide treatment, and interpreting federal and state plant regulations were common concerns among meeting participants. Finally, the Science Citation Index was used to identify scientists in other institutions who were recognizing the Station's published works.

2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Survey of the general public
- Survey specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Survey specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public

Brief Explanation

Although most of the stakeholder input received was verbal, written correspondence or completed surveys that were well designed to ask specific questions were likewise effective processes in collecting public input on research programs. Giving research reports, providing displays, and attending meetings of traditional stakeholder groups, such as the Connecticut (CT) Tree Protective Association, CT Nursery and Landscape Association, CT Pomological Society, Federated Garden Clubs, Pest Control Association, CT Academy of Science and Engineering, Christmas Tree Growers, Greenhouse Grower Association, Northeast Organic Farmers Association, CT Beekeeper Association, Backyard Beekeeper Association, and the Experiment Station Associates, were effective in collecting direct stakeholder input. Four meetings for the CT Greenhouse Growers Association were co-organized by a Station scientist and personnel in the UCONN extension system. When scientists met with the general public at two Open Houses (advertised to all) and at organized events where exhibits were displayed, verbal and written input was received from traditional and non-traditional stakeholders. Survey or evaluation forms were provided for more formal written comments. Special assistance provided by the New Haven Register in seeking survey results from the general public (mostly non-traditional individuals) to determine if stakeholders were following recommendations on reducing mosquito bites was especially useful. Inviting high school students and teachers to see Station laboratories and hear brief presentations on research resulted in collecting stakeholder input from selected individuals in the general population (mostly non-traditional individuals). The 15,084 diagnostic tests performed for traditional and non-traditional individuals also resulted in verbal and written stakeholder input. Finally, meeting with specific traditional and non-traditional individuals, such as state or federal legislative leaders or staff, was another effective method of collecting stakeholder input on research results and budgetary matters.

3. A statement of how the input was considered

- In the Budget Process
- To Identify Emerging Issues
- Redirect Research Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities

Brief Explanation

Verbal stakeholder input was considered by Station scientists, and in some cases, information was passed on to the Department Heads and Director. All written comments received in letters or survey forms are reviewed by the Director and discussed with the appropriate Department Head in re-establishing research priorities or initiating new studies. During this reporting period, there were several instances when stakeholder input was considered. At the request of stakeholders, 9,127 diagnostic tests were performed in the Department of Plant Pathology and Ecology. Fungal and bacterial infections of crops and other plants have economic impact and reporting information to the National Plant Diagnostic Network has relevance to other states in the northeast and elsewhere. Stakeholders want the high quality services continued at the present level. Consequently, another plant pathologist was hired to diagnose plant diseases and to initiate studies on fire blight, an important bacterial infection of fruit. Stakeholders requested increased research on evaluating soybean and rapeseed cultivars for biodiesel fuel production. The Director requested and received (1) a new position for a technician during the state budget process to assist on field and laboratory experiments and (2) special funds for harvesting equipment. Beekeepers expressed concern about declining honey bee populations (colony collapse disorder) and requested a state action plan on addressing accidental entry of Africanized honey bees. Station chemists and entomologists started research on pesticide poisoning of honey bees as a possible cause of colony collapse disorder and submitted two grant proposals for federal funding. A state action plan for handling Africanized honey bees was developed with stakeholder guidance. Training will be given to firefighters on how to de-populate a honey bee hive. In nurseries, mite and insect infestations of arborvitae and other economically important crops were having detrimental effects on plant vigor and quality. Field tests were performed in response to stakeholder requests. In other cases, stakeholders identified the following emerging issues: saltmarsh grass dieback, rising tick and deer populations in residential areas, lead in imported toys, sanitizing fluids and other chemical contaminants of food, toxic fumes being released from "tire crumbs" used in artificial turf, insect pests of regular grass turf, and indoor mold spore problems in public buildings. Accordingly, research priorities were re-assessed to address these issues. All written comments received by the Director are summarized and discussed with appropriate Department Heads, and in some cases, specific objectives are included in the managers' annual performance goal programs. Responses are sent to those stakeholders who submitted letters to the Director or other Station staff members.

Brief Explanation of what you learned from your Stakeholders

Frequent interactions with traditional and non-traditional stakeholders revealed many concerns and resulted in greater awareness of emerging problems. Potential environmental, economic, or health impacts became apparent. Station scientists and administrators learned that the dieback of grasses in saltmarshes in Connecticut and other eastern seaboard states was extensive and that erosion of soil in intertidal areas was occurring. Nursery growers enlightened Station staff members about the extent of mite and insect damage of crops and about the increasing problem of insect resistance to certain pesticides. Members of lake associations described the problems of rapid growth of invasive plants and the corresponding deterioration of water quality. The general public responded to surveys and revealed their deep concerns over food safety. We learned that most people do not have confidence in the quality of imported foods and want strict federal regulations on product labeling to disclose country of origin. The latter has been conveyed to Congressional offices. Increased surveillance for unwanted chemicals in foods was requested by the public, and the Station responded accordingly. Conversations with municipal officials revealed the serious problem of allergic reactions of teachers and students to indoor mold problems in schools. Homeowners have expressed their concerns over the increased spread of ticks that transmit disease organisms that cause Lyme disease, granulocytic anaplasmosis, and human babesiosis. These people clearly described the impact that these diseases have on their lives and the need to develop tick control programs for homeowner properties. We learned from stakeholders in the wood products industry that cut maple and oak are important export products and that deer are affecting forest structure by destroying young saplings. Dairy farmers have expressed a willingness to cooperate in producing biodiesel fuel by planting rapeseed and soybeans as a cover crop. We learned from grape growers how to properly graft plants so that experiments on identifying winter hardy plants could continue. Bedding plant growers taught Station scientists and a University of Connecticut extension specialist how to build and operate a new, self-contained irrigation system in a greenhouse now located at Lockwood Farm. Finally, Station scientists assist as judges in science fairs and spend time encouraging youth, an under-served group, to consider science as a career. We learned that teachers, parents, and students appreciate these outreach efforts and want further assistance to promote science in our youth. Similarly, positive stakeholder input was received from growers and ethnic groups (Hispanic, Brazilian, and Asian) praising the Station's efforts to provide information on cultivars of specialty crops, such as jilo, calabaza, garlic, leeks, and Chinese cabbage.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	1282498	0

2. Totaled Actual dollars from Planned Programs Inputs				
Extension			Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	0	0	806696	0
Actual Matching	0	0	4833867	0
Actual All Other	0	0	1760739	0
Total Actual Expended	0	0	7401302	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous years				
Carryover	0	0	0	0

V. Planned Program Table of Content

S. NO.	PROGRAM NAME
1	Plant and Integrated Pest Management Systems
2	Food Safety and Biosecurity
3	Human and Animal Health
4	Soil and Water Quality

Program #1**V(A). Planned Program (Summary)****1. Name of the Planned Program**

Plant and Integrated Pest Management Systems

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
205	Plant Management Systems			25%	
211	Insects, Mites, and Other Arthropods Affecting Plants			15%	
216	Integrated Pest Management Systems			60%	
	Total			100%	

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	19.0	0.0
Actual	0.0	0.0	12.1	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	440748	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1889266	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	182269	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

The expected outputs (i.e., activities, services, events, and new crops that reach people) are designed to assist a broad, diverse group of stakeholders by primarily disseminating scientific information to these people. All activities of this planned research program will ensure that people have equality of service and access to Station facilities to receive direct assistance from scientists. The following activities are planned: (1) Station scientists will partner with stakeholders and participate in their organizations as members or officers, (2) Station scientists will conduct workshops or meetings for stakeholders, (3) experiments will be performed on stakeholders' properties as well as on Station research farms, (4) diagnostic services will be provided to stakeholders, (5) training on IPM practices and other methodologies will be provided to stakeholders, (6) staff members will disseminate written information on research findings by presenting scientific displays at agricultural fairs and giving talks and interviews to civic groups, and (7) staff members will work with the media and provide information on scientific discoveries. Public service is an important component for all output measures. For example, all state residents are allowed to enter Station facilities and request direct assistance on diagnosing insect or plant disease problems. In this approach for delivering services, about 20,000 stakeholders are expected to benefit from these activities annually. Station scientists are members or officers in dozens of stakeholder groups. This provides opportunities for stakeholder input on the research program and facilitates reporting of research results. The non-traditional stakeholders are reached at agricultural fairs when they visit and inquire about Station displays. Two open houses are scheduled annually on Station properties to allow the public to hear oral presentations on research results and to offer comments. Hundreds of talks and interviews are given to civic groups and the media to convey research results and to receive public input. Research experiments are important activities that lead to solutions to problems or information on new crops. Whenever possible, these experiments are conducted on farms or other private properties to encourage stakeholder engagement in the research. Results of these output activities lead to specific outcomes, such as reducing pesticide use, controlling insects or plant disease pathogens, the introduction of new crops, and increased farm income. Scientific publications in peer-reviewed journals or articles written for the general public reach traditional and non-traditional groups of stakeholders.

2. Brief description of the target audience

To be effective, there should be a diverse group of targeted audiences, which include under-served and under-represented stakeholders. The Connecticut Agricultural Experiment Station does not receive extension funds but, nonetheless, serves a variety of farmers who grow vegetables, fruits, nursery stock, cattle, and flowers. Station scientists coordinate with The University of Connecticut extension specialists in planning grower meetings. The broad goals of the Station's research program also include work on forestry and environmental problems. Accordingly, target audiences include landscapers, conservation officers, foresters, arborists, beekeepers, maple syrup producers, seed companies, and persons in the wood products industry. Efforts are also made to reach water company officials, horticulturalists, groundskeepers, pest control operators, pesticide manufacturers and retailers, environmental regulators, extension specialists, and municipal officials. Scientists and government officials are also important target audiences for new experimental results. This research program is designed to reach the general public, which includes non-traditional stakeholder groups. Homeowners, who have interests in agriculture and forestry, have access to laboratories and scientific results as well as equality of service. Women, members of minority organizations, and children are examples of under-represented and under-served groups, important target audiences. Efforts will be made to reach Brazilian, Hispanic, Asian American, African American, and Native American populations as well as elementary and high school students.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	18000	15000	600	150
2007	30135	106427	7069	550

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed**3. Publications (Standard General Output Measure)****Number of Peer Reviewed Publications**

	Extension	Research	Total
Plan			
2007	0	11	11

V(F). State Defined Outputs**Output Target****Output #1****Output Measure**

- # of research papers

Year	Target	Actual
2007	40	65

Output #2**Output Measure**

- # of site visits to solve problems

Year	Target	Actual
2007	200	224

Output #3**Output Measure**

- # of talks and interviews given to stakeholders

Year	Target	Actual
2007	350	605

Output #4**Output Measure**

- # of responses to stakeholders' inquiries

Year	Target	Actual
2007	1700	16229

Output #5**Output Measure**

- # of diagnostic tests performed

Year	Target	Actual
2007	1100	6589

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O No.	Outcome Name
1	# of homeowners gaining knowledge on insect pests and plant pathogens
2	# of homeowners learning practices to control plant and household pests
3	# of media reporters gaining knowledge on research results
4	# of students learning agricultural skills
5	# of growers adopting IPM practices

Outcome #1**1. Outcome Measures**

of homeowners gaining knowledge on insect pests and plant pathogens

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1150	9738

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Homeowners, including farmers, rely on Station diagnostic services to solve plant pest problems. Crops and houseplants can suffer from fungal and bacterial infections and insect and mite damage. Homeowners do not want their plants to decline or die prematurely, and they seek remedies from staff members who are knowledgeable. Scientists are likewise interested in the reasons why plants decline because the cause(s) might reflect an emerging pathogen that needs immediate attention.

What has been done

Diagnoses of insect and plant disease problems were performed on 9,738 samples submitted by stakeholders in person or by mail. Results and suggestions for control were forwarded back to the stakeholders along with written information on the pest. In about 30% of the inquiries, stakeholders visited the diagnostic laboratories to see a staff member for advice.

Results

Diagnostic test results provided immediate new knowledge on what was causing the decline or premature death of plants. Treatments of pesticides were applied as remedies. During these activities, an extensive powdery mildew problem of pumpkins was discovered. Growers requested biological controls and other options to reduce pesticide use and costs. In field and laboratory experiments, a 50% by volume aqueous solution of milk-based foliar sprays was used to reduce crop damage. There was a savings of about \$68.00 per acre in fungicide costs. Application of this method statewide on 1,559 acres of pumpkins would save growers about \$106,000. These results have application to powdery mildew infections of other plants as well. Expected long-term benefits include less human exposure to pesticides, thereby reducing health risks, and a cleaner environment.

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants

Outcome #2**1. Outcome Measures**

of homeowners learning practices to control plant and household pests

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1500	1534

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Homeowners (including farmers) want to know how to control plant and household pests. Problems that occur on private and commercial properties can sometimes be solved by using biological controls, insecticidal soap, or horticultural oil. People want healthy plants, a clean and comfortable indoor or outdoor environment free of pests and chemical pesticides, and high-yielding, quality crops.

What has been done

Different methods, such as the use of fact sheets, were used to teach residents how to control pests. At our summer Plant Science Day (Station Open House), demonstrations on plant pest control were given. Also, in commercial operations, scientists visited properties and conducted experiments there. There were frequent farm visits, and stakeholders participated by contributing to the experimental design and using their own equipment and materials in the experiments.

Results

Annual bluegrass weevil is a major pest of homeowner lawns and intensively managed golf course turf. The use of pyrethrin insecticide has become less effective because of pest resistance. Homeowners and golf course managers had no way to assess degree of resistance. Accordingly, soil test kits were developed and extension entomologists at the Univ. of Connecticut, Univ. of Massachusetts, Univ. of Rhode Island, and Cornell along with golf course managers learned how to determine the degree of pesticide resistance at selected sites. There was a positive outcome because lawn care professionals adopted non-chemical, alternative control methods, such as the use of insect pathogenic nematodes, for managing weevils. There was impact because a biological control agent could be used effectively in homeowner or golf course settings where pyrethrins were no longer effective. Long-term benefits will include less human exposure to chemical pesticides and quality turf for homeowner lawns and recreation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems
205	Plant Management Systems

Outcome #3**1. Outcome Measures**

of media reporters gaining knowledge on research results

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	10	9

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The general public desires new knowledge on how to control plant pests with biological methods rather than the widespread use of chemical pesticides. Farmers want to reduce pesticide costs and user exposure to these chemicals as well. Media reporters recognize public interest in having a cleaner environment and, likewise, seek new knowledge on pest control so that this information can be transferred to a broad base of stakeholders.

What has been done

Reporters interviewed scientists and saw laboratories. There were at least 7 newspaper articles or other news releases on plants and IPM systems covering a wide range of topics, such as crops, trees, and homeowner plantings. Station scientists gave 605 talks with reporters were in attendance. Interviews were relied on to release new findings. At the summer Plant Science Day event, public television (CTN) taped talks given by scientists and telecasted the presentations to state residents.

Results

Reporters learned about crop resistance to pest problems, the use of mulching and other cultural practices that reduce reliance on the use of chemical pesticides, and about greenhouse production of tomatoes with little or no pesticide use. The reporters accurately transferred new findings verbally or in written form to stakeholders. For example, a newspaper reporter learned that a new technique of heating the soil by blowing hot air from a forced-air furnace through ducts beneath raised beds in a greenhouse resulted in a greater yield (16% increase) and a higher quality of tomato, compared to unheated soil. She also learned that there is an expected net profit of about \$880 per greenhouse or \$52,800 for 60 greenhouses when the new heating method is used and that the long-term benefits will include greater profits for growers, less pesticide use in greenhouses, and a source of locally grown, nutritious food for consumers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants

Outcome #4**1. Outcome Measures**

of students learning agricultural skills

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	500	493

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

In an effort to reach youth, an under-served group, Station scientists participated as judges in science fairs, showed exhibits and gave demonstrations at Farm/City Week and Plant Science Day events, and organized tours of laboratories and experimental plots. Parents want their children to learn about science, including agricultural skills of growing crops. Science teachers request assistance in promoting interests in biology and chemistry.

What has been done

Scientists served as judges in science fairs, displayed exhibits at public events where youth of mixed racial and ethnic backgrounds attended, and hosted elementary and high school students and teachers during tours of facilities. Hundreds of students toured chemistry laboratories and saw demonstrations on the use of analytical equipment. Students in an urban school were allowed to grow vegetables for their own use at a Station research farm and were taught good farming practices.

Results

Inner city minority students learned how to grow vegetables and flowers, control plant pests by using mulching and biological control practices, and to fertilize and rotate crops. Elementary and high school students learned about honey bees. High school students learned that equipment used in analytical chemistry can measure chemicals in very small quantities (parts per billion) and that foods are tested for unwanted chemicals. These efforts to change knowledge in students about agriculture had impact. The students who learned how to grow vegetables shared their knowledge with family members and neighbors who were participating in urban community garden programs. Based on verbal and written feedback from teachers, there was increased interest among students in science. New knowledge on honey bees, in particular, was applied in science projects in elementary schools. The expected long-term benefits are a better educated youth population and increased interests in science.

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems
205	Plant Management Systems

Outcome #5

1. Outcome Measures

of growers adopting IPM practices

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	25	12

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Pesticides increase farm costs, can cause toxic effects on users and consumers, and can pollute soil and surface and ground water. Farmers want to reduce amounts of pesticides used and exposure to chemicals, whereas some people want no pesticides in foods or in the environment. The development of IPM programs benefits farmers and consumers.

What has been done

At the request of the nursery industry, field tests were conducted to develop more accurate monitoring systems for rising scale and mite populations on arborvitae. Permethrin-based insecticides were evaluated for control. The objective was to protect an economically important crop that is exported from Connecticut by using minimal amounts of less toxic pesticides.

Results

Minimal, well-timed applications of permethrin during the spring greatly reduced populations of mites and scale insects. Monitoring programs identified the critical period for control. During 2007, managers in 4 large nurseries and 8 small operations learned and used the IPM protocol; 364,776 treated (non-infested) arborvitae plants (valued at \$12,767,160) were shipped and sold in the US. Long-term benefits, which will result in knowledge changes, include a cleaner environment because permethrin-based insecticides degrade rapidly outdoors. Moreover, these insecticides are far less toxic to the users, compared with organophosphates. With this new IPM approach, there will be continued profitability for nursery growers, greatly reduced state and regulatory problems because infested plants are not being shipped across state borders, less pesticide residues in nurseries, less risk of contaminating ground and surface waters, and less human exposure to pesticides, thereby reducing health risks.

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems
205	Plant Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges
- Other (Media influences)

Brief Explanation

The resignation of an IPM specialist adversely affected outcomes because the new knowledge could not be effectively transferred to more nursery managers. Consequently, the actual quantitative target outcome of 25 growers adopting IPM practices was partially met. There were no other external factors that impeded outcomes.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)

Evaluation Results

Three planned evaluation studies were conducted during this reporting period. "After only" evaluations verified that there were knowledge changes in reporters. "During program" evaluations showed that there were knowledge changes in 493 students, whereas "before and after" program on-site evaluations and observations indicated that there were positive outcomes in the control of pests on bluegrass and arborvitae.

Key Items of Evaluation

The Science Citation Index verified that 206 published articles on plant systems, written by 23 scientists over 28 years, were cited by scientists at other institutions (total cumulative citations = 4,287). Ten accurately published news articles showed that knowledge changes had occurred in reporters. Verbal feedback from teachers verified knowledge changes in youth. On-site observations and evaluations verified success in new IPM methods.

Program #2**V(A). Planned Program (Summary)****1. Name of the Planned Program**

Food Safety and Biosecurity

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
711	Ensure Food Products Free of Harmful Chemicals, Including			100%	
	Total			100%	

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	2.0	0.0
Actual	0.0	0.0	1.5	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	221141	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	155062	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	27963	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

The expected outputs (i.e., activities, services, and events that reach people) are designed to assist a broad, diverse group of stakeholders by mainly disseminating scientific information to the public. People will have equality of service and ease of access to scientific results. The state-generated outputs include numbers of food samples tested, scientific publications, and talks and interviews. The following activities are planned: (1) staff members will disseminate written information on research findings to the media upon request, at open house events, and in scientific displays at agricultural fairs and (2) oral presentations will be given to civic groups. Direct interactions with a broad base of stakeholders provide a mechanism for public input on the research program. Non-traditional stakeholders are reached at agricultural fairs when they visit Station displays. Two open houses are scheduled annually on Station properties to allow the public to hear oral presentations on research results and to offer comments. Results of these activities will lead to specific outcomes, such as removing tainted or adulterated food items from the markets.

2. Brief description of the target audience

A diverse group of targeted audiences includes: state and federal public health officials and regulators, legislators and their staff members, food producers and importers, managers of supermarkets, educators, extension specialists, researchers in food sciences, and the general public. Women, members of minority organizations, and children are examples of under-represented and under-served groups.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	1000	1000	1000	500
2007	1119	4090	1476	2250

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	0	1	1

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of research papers

Year	Target	Actual
2007	3	3

Output #2

Output Measure

- # of talks and interviews

Year	Target	Actual
2007	20	18

Output #3

Output Measure

- # of tests performed

Year	Target	Actual
2007	700	763

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O No.	Outcome Name
1	# of stakeholders gaining knowledge of food safety

Outcome #1**1. Outcome Measures**

of stakeholders gaining knowledge of food safety

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1500	1599

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Consumers, food producers and importers, physicians, public health officials, and legislators recognize the potential threats of contaminated foods, beverages, and other products entering commerce. News stories re-affirm that a variety of products sometimes contain unwanted chemicals or microbes that can cause human illness or death. Stakeholders requested that foods, toys, and other products be tested to reveal and correct violations and to give some reassurance that foods are safe to eat.

What has been done

At the request of state officials in agriculture and consumer protection, milk samples were collected from 2 elementary schools where children became ill after drinking this beverage, toothpaste imported from China was analyzed for suspected ethylene glycol (antifreeze), and toys imported from China were analyzed for lead. Results were reported to state officials and subsequently released through the media to the public to change existing conditions and prevent human illnesses.

Results

Milk samples contained sanitizing fluid, which was used in a dairy processing plant to flush filling lines. A prompt recall of milk products and corrective actions taken in the dairy plant prevented further illnesses. Toothpaste, which contained components of antifreeze, was removed from state hospitals and prisons to prevent adulterated products from reaching people. State officials in the Departments of Consumer Protection and Emergency Management and Homeland Security ordered a product recall in the state and requested federal action to mandate stricter labeling requirements. In analyses of toys, paint samples from selected items contained lead in amounts exceeding 660 ppm, a concentration considered unacceptable. These results had impact because there was a national recall of the toys from the marketplace to prevent adulterated products from reaching infants and children. A more extensive monitoring program was established in Connecticut to check lead content in toys.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources

V(H). Planned Program (External Factors)**External factors which affected outcomes**

- Appropriations changes
- Competing Programmatic Challenges

Brief Explanation

There were no external factors, such as appropriation changes, competing programmatic challenge or staff changes that affected the outcomes. Analytical equipment operated normally. Planned program objectives were met.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- During (during program)

Evaluation Results

Information on research and service results was obtained “during the program” evaluations at public meetings (2 Open Houses), civic groups’ meetings, and at Station exhibits received positive feedback from stakeholders. There was sufficient interest among media reporters, and at least 2 articles were written for the New Haven Register and Hartford Courant. Observations made during interviews with stakeholders revealed positive stakeholder sentiment about program effectiveness and value. Letters of appreciation were received from 3 Commissioners of state agencies.

Key Items of Evaluation

The key items of evaluation and data collection were as follows: media reporters’ responses upon learning about research and service findings, letters received from public officials, and verbal responses received from stakeholders at public meetings. The Citation Index indicated that 19 articles, written by 4 scientists and covering 32 years of work, were recognized and cited by scientists in this field (total cumulative citations = 462).

Program #3**V(A). Planned Program (Summary)****1. Name of the Planned Program**

Human and Animal Health

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
722	Zoonotic Diseases and Parasites Affecting Humans			100%	
	Total			100%	

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	5.0	0.0
Actual	0.0	0.0	10.9	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	92037	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1178403	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	1530198	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

The expected outputs are designed to benefit a broad base of stakeholders, such as public health officials, physicians, veterinarians, and the general public. State-generated outputs mainly include scientific publications, talks and interviews, identifying and testing ticks for the Lyme disease agent, and numbers of state residents served directly by answering inquiries. For activities, staff members will (1) disseminate information on research findings by giving talks and media interviews, (2) analyze ticks, (3) answer public inquiries, and (4) train public health officials on control methods. All activities strongly emphasize public service and include traditional and non-traditional stakeholders. Two open houses are planned annually on Station properties to allow the public to hear oral presentations on research findings and to offer comments. Results of these activities will lead to specific outcomes, such as reducing the number of tick and mosquito bites.

2. Brief description of the target audience

A diverse group of stakeholders will benefit as target audiences. Research findings are directly transferred to scientists via peer-reviewed journals and conferences. The general public is reached by means of agricultural fairs, open houses, TV, radio, and newspaper articles. Media reporters frequently request information for stories. Oral presentations will be given to public health officials in meetings and, as requested, to civic groups. Also, state residents are allowed to submit ticks through local health departments for identification and analysis for the Lyme disease agent. Results are reported to public health officials who then inform the residents. General information on tick-related research is also provided. Fact sheets and other information posted on the Station website are made available to everyone. Although these communication venues allow for extensive contacts with the public, special efforts are made to reach under-served and under-represented groups. Information on ticks and mosquitoes is printed in Spanish, and displays at agricultural fairs and open houses are created to attract the interest of children. Participation in agricultural fairs is particularly effective in reaching non-traditional stakeholder groups.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	3000	2000	200	100
2007	4176	3163	1503	3075

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	0	14	14

V(F). State Defined Outputs

Output Target

Output #1**Output Measure**

- # of research papers

Year	Target	Actual
2007	3	17

Output #2**Output Measure**

- # of talks and interviews

Year	Target	Actual
2007	125	139

Output #3**Output Measure**

- # of responses to stakeholders' inquiries

Year	Target	Actual
2007	135	2877

Output #4**Output Measure**

- # of ticks identified or tested

Year	Target	Actual
2007	3500	4855

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	Outcome Name
1	# of residents gaining knowledge of ticks and mosquitoes
2	# of media reporters gaining knowledge of ticks and mosquitoes

Outcome #1**1. Outcome Measures**

of residents gaining knowledge of ticks and mosquitoes

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	4550	9331

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Pathogens transmitted by ticks and mosquitoes or the presence of mold spores in buildings can cause illnesses or death in people and domesticated animals. People live in or enter forests and other habitats infested by these arthropods. The general public, physicians, veterinarians, agricultural workers, and public health officials care about research conducted on ticks, mosquitoes, and mold because they promote good health and want to know how they can reduce risk of infections.

What has been done

During this reporting period, 157,476 mosquitoes were collected from 91 trap sites in Connecticut and tested for encephalitis viruses. Results were released through the media, and preliminary surveys were conducted to determine if stakeholders follow state recommendations to reduce mosquito bites. Cat sera were analyzed for antibodies to the bacterial agent that causes tularemia, an infection that can cause death in people and domesticated animals.

Results

There were 69 isolations of West Nile virus and 5 isolations of Eastern Equine Encephalitis. There were no human deaths linked to either virus. News releases included information on how residents can protect themselves from mosquito bites, such as the use of repellents. Although the survey results were anecdotal, this activity still had some impact because 50% of the 140 residents who responded in 2 different surveys clearly indicated that they were taking precautionary steps to reduce mosquito bites. Of the 91 cat sera tested for antibodies to the tularemia agent, 12% and 24% were positive in 2 different assays. These findings had an impact because veterinarians and physicians are now considering tularemia in differential diagnoses as a possible disease when patients have unknown febrile illness. The long-term benefits include a healthy human and domesticated animal population and a well-informed public concerning pathogens transmitted by mosquitoes and ticks.

4. Associated Knowledge Areas

KA Code	Knowledge Area
722	Zoonotic Diseases and Parasites Affecting Humans

Outcome #2**1. Outcome Measures**

of media reporters gaining knowledge of ticks and mosquitoes

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	10	55

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Reporters, who seek information on mosquitoes, ticks, and associated diseases, are interested in new knowledge gained from research on the spread of disease organisms in nature and the status of tick and mosquito population densities. Lyme disease is prevalent in Connecticut. West Nile virus, an exotic pathogen, is relatively new to North America, and its entry in 1999 and subsequent detrimental effects on humans and horses illustrate the importance of monitoring for emerging pathogens.

What has been done

There were at least 55 media reports of research findings on mosquitoes, encephalitis viruses, ticks, and tick-transmitted disease organisms. By interviewing scientists conducting field and laboratory investigations, the reporters gained new knowledge of mosquitoes and ticks and transferred this information to the general public. Tens of thousands of stakeholders were kept informed of recent research findings and the significance of scientific advances.

Results

There were 53 news stories on mosquitoes and ticks, prevalence of disease agents in these arthropods, or methods of control. Articles written by 35 reporters accurately transferred results to stakeholders. These actions had impact because upon learning about the presence of West Nile virus in the environment; some municipalities responded by controlling larval mosquitoes. Also, hundreds of residents learned about the diagnostic services available to test ticks for the Lyme disease agent and submitted 4,855 ticks for analyses. Stakeholders learned whether or not ticks were infected and received a fact sheet on how these arthropods transmit the Lyme disease organism. In many instances, ticks were not engorged with blood, and since no transmission of pathogens can occur under these conditions, there was no need for unnecessary antibiotic treatment.

4. Associated Knowledge Areas

KA Code	Knowledge Area
722	Zoonotic Diseases and Parasites Affecting Humans

V(H). Planned Program (External Factors)**External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

There were no external factors which affected outcomes. Funding and staff numbers were stable. There were no changes in public policy, competing priorities, or competing programmatic challenges.

V(I). Planned Program (Evaluation Studies and Data Collection)**1. Evaluation Studies Planned**

- After Only (post program)
- Before-After (before and after program)
- During (during program)

Evaluation Results

“During program” and “after only” evaluations were conducted to assess program effectiveness. The treatment of mosquito larval habitats, following news releases of West Nile virus infections in mosquitoes, successfully reduced mosquito populations at selected, key sites. Two surveys of stakeholders demonstrated that in 50% of 140 respondents there was a transfer of new knowledge on mosquitoes and ticks and there were changes in the behavior of stakeholders to reduce mosquito and tick bites.

Key Items of Evaluation

Data were collected mainly by on-site verbal evaluations conducted following talks to civic groups; a survey conducted by the New Haven Register; and face-to-face interactions with reporters and other stakeholders. Review of Science Citation Indexes revealed that 129 scientific articles, written by 7 scientists over 32 years on mosquitoes and ticks, were being recognized and cited by other scientists in the field (total cumulative citations – 4,077).

Program #4**V(A). Planned Program (Summary)****1. Name of the Planned Program**

Soil and Water Quality

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
133	Pollution Prevention and Mitigation			100%	
	Total			100%	

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	5.0	0.0
Actual	0.0	0.0	4.8	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	52770	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1611136	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	20309	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

The expected outputs are scientific publications, newsletters, and fact sheets; talks and interviews; and numbers of state residents served directly by analyzing soil samples or identifying invasive aquatic weeds. All activities, services, or events are designed to disseminate new information to stakeholders and to seek their input on the research program. Interactions with members of lake associations in group discussion, workshops, and one-on-one interventions are particularly important because permission must be granted to perform experiments on removing aquatic weeds from lakes. Limited diagnostic services are available to determine the extent of pollution problems and to determine the success of field experiments. Information will also be made available to all stakeholders on the Station website, in newsletters and fact sheets, and in displays at the open houses or at agricultural fairs. It is also expected that there will be interest from reporters to write articles on the research, thereby enhancing the educational process. Results of these output activities will lead to specific outcomes, such as removing pesticides from soil and water, clearing lakes and ponds of invasive aquatic plants, and preventing pollution.

2. Brief description of the target audience

A diverse group of stakeholders, including under-represented and under-served persons, is targeted. It is expected that the following stakeholder groups will directly benefit from the research: farmers, lake associations, homeowners, water company officials, environmentalists, extension specialists, corporate and municipal officials, and pesticide producers. Special efforts will be made to contact and include members of minority organizations, women, and children to provide information and to participate in open house events.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	1000	500	75	50
2007	7829	9183	201	575

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	0	5	5

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of research papers

Year	Target	Actual
2007	2	8

Output #2

Output Measure

- # of talks and interviews given to stakeholders

Year	Target	Actual
2007	30	105

Output #3

Output Measure

- # of diagnostic tests performed

Year	Target	Actual
2007	1000	2877

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	Outcome Name
1	# of homeowners gaining knowledge on pesticide pollution and invasive aquatic plants
2	# of homeowners gaining knowledge on soil and water quality

Outcome #1**1. Outcome Measures**

of homeowners gaining knowledge on pesticide pollution and invasive aquatic plants

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	75	1032

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Homeowners know that chlorinated insecticides can persist in soil for many years, and people who own or rent lake-front properties are aware of the rapid growth and spread of invasive aquatic plants. Soil and water quality issues rank high in public surveys on environmental problems. People who live near farms where pesticides are used are concerned about contamination of well water.

What has been done

Workshops were conducted to train volunteers on how to identify invasive aquatic plants so that boats could be checked for plant debris before entering lakes. Volunteers worked during the warmer months to help prevent the introduction of invasive aquatic plants into lakes.

Results

During 2007, 5 workshops were conducted in Connecticut, and 138 persons (representing 37 towns and cities) learned how to identify invasive aquatic plants. Surveys conducted after the workshops indicated that these stakeholders had learned how to identify aquatic weeds and were pleased with the educational efforts made. Follow-up interviews with volunteers indicated that the boat-checking procedures had a positive outcome. The knowledge that the volunteers gained about invasive aquatic plants was transferred to boaters. There were increased efforts by boaters to remove plant debris from their boats. The new knowledge gained resulted in a change in behavior regarding the efforts to prevent the spread of invasive aquatic plants. Long-term benefits will include a better educated population and enhancing water quality in lakes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation

Outcome #2**1. Outcome Measures**

of homeowners gaining knowledge on soil and water quality

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1000	1553

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Homeowners, landscapers, farmers, and managers of golf courses want information on fertilizers. They desire quality crops and healthy lawns. Excessive and widespread use of fertilizers, however, can pollute surface and ground water. High nitrogen and phosphorous concentrations encourage rapid growth of algae and invasive aquatic plants, resulting in eutrophication and reduced water quality in lakes. People who enjoy lakes and ponds and who desire water quality want less fertilizer use.

What has been done

At the request of stakeholders, 2,877 soil tests were performed and specific written results on soil quality and information on fertilizer needs were transferred to those who submitted samples. In many instances, verbal responses were given to stakeholders who visited or called with inquiries.

Results

Of the 2,877 soil tests performed, 144 (4%) samples were adequate for plant growth and did not need any fertilizer applications. These homeowners, who learned that no fertilizers were required, saved money (about \$2,200 in total). Another positive outcome is that there will be less fertilizer leaching into ground or surface waters. Long-term benefits will include less pollution of bodies of water and an overall cleaner environment.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation

V(H). Planned Program (External Factors)**External factors which affected outcomes**

- Economy
- Appropriations changes
- Other (Unexpected changes in workforce)

Brief Explanation

There were no external factors that affected outcomes.

V(I). Planned Program (Evaluation Studies and Data Collection)**1. Evaluation Studies Planned**

- Before-After (before and after program)
- During (during program)

Evaluation Results

"Before and after" and "during" evaluations were conducted to document increased knowledge of aquatic plants, whereas "during" evaluations were most helpful in assessing advanced knowledge of stakeholders on soil and water quality issues. Of the 138 persons trained on aquatic weeds, 86 (62%) replied verbally or in writing that the new knowledge they gained was very useful.

Key Items of Evaluation

Written information on survey forms following workshops (on-site) and verbal feedback from interviews with volunteers and other stakeholders (unstructured) were important information collection methods for program assessments. The Science Citation Index verified that 59 published articles written by 4 scientists over 25 years on the general topic of soil and water quality, were being cited by scientists in other institutions (total cumulative citations = 2,512).